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SCIENTIFIC BOOKS.

A Short History of Astronomy. By ARTHUR BERRY. New York, Charles Scribner's Sons. 1899. Pp. xxi + 440. Price, \$1.50.

Astronomy is a science whose history may be said to have been over-exploited. In French there are the great works of Delambre, La Place and Bailly, Biot and Tannery; in German, those of Jahn and Wolf, Epping and Strassmayer; and in English, mainly Grant's classic work, which won him the gold medal of the Royal Astronomical Society, Sir George Lewis's *Astronomy of the Ancients*, and Miss Clerke's admirable, accurate and delightfully readable history of astronomy during the 19th century, not to mention other and more recent works by Sir Norman Lockyer.

Clearly there could have been no clamor for a new history when Mr. Berry, an assistant tutor at Cambridge, England, undertook his task; if demand there was, it was rather the exigency of the 'University Series.' Had its volumes been twice their present size, and had Mr. Berry taken time to familiarize himself with originals, instead of compiling 'largely from second-hand sources,' as he has to admit, his book would still have been but a 'Short History'; but he might well have achieved a contribution of permanent worth, for he is by no means deficient in aptitude for the task. However, his confessed lack of knowledge of and sympathy for the observational side of the science has induced him to erect his edifice on insufficient foundations, so that homogeneity of structure is baldly impossible.

Although the illustrations number 120, there is no picture of a telescope save one a hundred years old and more; no statement of the principle of the achromatic telescope, without which the astronomy of to-day would for the most part have been non-existent; no mention of Dollond, its acknowledged inventor, nor of the greatest builders of telescopes—Grubb, the Henry Brothers, Steinheil—not even the Clarks. Spectroscopes, the very staff of the new astronomy, are singularly neglected. With this author, compression has been insistent, but it has largely been gained by deliberate and not very well considered exclusion. His work

thus produces an impression of being fragmentary rather than comprehensive.

Firstly, it seems unnecessary to have devoted an initial twenty pages to sheer elements, found in, and only appropriate to, a mere textbook of secondary grade. The most ancient astronomy is dismissed in rather summary fashion, as was necessary. Archaic and elementary mathematical conceptions are well sketched, and the frequent biographic notes afford a much needed enlivening of the text, although of slender astronomical significance.

Mr. Berry perpetuates the old-time error regarding annular eclipses, by a diagram showing an impossibly large sun centrally obscured by an impossibly small moon, still further darkened by impossible black spots on its surface (page 59). The advances of Hipparchus and Ptolemy are excellently narrated. With the life and work of Copernicus, Kepler, Galileo and Descartes is concluded the first half of the volume.

Naturally, the lives and works of Newton and the Herschels receive the fullest attention; but Mr. Berry fails to state the law of universal gravitation quite correctly, its most general form involving the product of the masses of bodies concerned, not their sum (page 228). And it would be rather difficult to defend this book against the charge of insularity, for the English astronomers are accorded vastly more consideration than the Continental, let alone Americans, who are conspicuously passed over. We have only scanty space for a catalogue of especial omissions; but may instance, among Germans, the classic work of Schmidt and Lohrmann on the moon, of Brünnow and C. A. F. Peters on stellar distances and the constants of astronomy, of Chladni upon meteors, of Kaiser upon the planets, of Heis upon meteors and stellar magnitudes, of D'Arrest and Lamont upon the nebulae, of Oppolzer upon eclipses, of Auwers upon stellar catalogues and other departments of exact astronomy, and of Spoerer upon the sun, his remarkable 'law of spot zones' being nowhere alluded to. For France and Italy the omissions are less serious, though Gassendi, De l' Isle, Pingré, Lemonnier, Montucla, Méchain, Oriani, Pons, Foucault and Deslandres were much better included than

ignored; while among Americans we look in vain for C. H. F. Peters and Watson, Benjamin Peirce and G. P. Bond, Olmsted and H. A. Newton, Rutherford and the Drapers, the Clarks and Gould, and Langley's epoch-making research on the infra-red rays of the solar spectrum.

When Mr. Berry reaches the 19th century, staggered by the accumulation of material, he deliberately abandons his task by attempting a summary in a single chapter. Here he scores a signal failure, in a sketchy agglomeration of fragments, with omissions quite as prominent as inclusions. As a running précis, or evanescent periodical paper, the chapter is excellent, though proportionately out of balance with the preceding twelve chapters. Parts of Mr. Berry's book are so well done that a subsequent edition would be quite worth an expansion or sub-division of this chapter, for the sake of appropriate exposition of the 'New Astronomy,' and the instrumental means that alone have made its marvelous revelations possible. Had the whole of Mr. Berry's short history been compressed proportionately to this chapter, the book would have been but one-third its present size. Solar research, in particular, is dismissed very cavalierly.

Every one using Mr. Berry's compend for reference would appreciate a new index. A double index is a mistake. But a greater one is the baffling system of reference, wholly ignoring the pages of the book, and increasing at least fourfold the time and labor of finding any indexed allusion to a name or subject. What is printed is simply an index to the MS., not to the printed volume itself; whereby the author has saved his own time and that of his helpers, but has wasted that of everybody who attempts to use his book as a reference work. The same remark applies to frequent cross-references throughout the volume, which would otherwise have been most helpful.

Misprints are, fortunately, few, but we find preserved and dignified that widespread error of the common kind that the navigator gets his longitude from solar sights at apparent noon: were all navigators to follow this method, and no other, we wonder how many ships would escape being put ashore. Nine excellent por-

traits of astronomers adorn the book, from Copernicus to Sir William Herschel.

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De la methode dans la psychologie des sentiments.

Par F. RAUH. Paris, Felix Alcan. 1899.

This book is not what the title would suggest, a monograph on Method in the Psychology of Emotion, but a general summary and discussion of theories of emotion, particularly of recent theories, and of methods so far as involved. After some introductory definition M. Rauh takes up the physiological, intellectual, the biological or voluntarist, and the specialist theories, if we may summarize the theories by abridging his terms. His critique of the physiological, or organic, theory of the James-Lange school is quite full. He concludes: "On peut dire qu'une des caractéristiques de la psychologie physiologique a été la superstition du mouvement, en particulier du mouvement musculaire. Si au lieu de considérer les relations des faits de conscience et des mouvements périphériques, on considère celle des faits de conscience et du cerveau, nous avons vu combien cette correspondance est complexe et encore obscure. Ce qui fait croire que l'on peut expliquer scientifiquement les sentiments et en général les faits de conscience par les mouvements organiques, c'est que ces mouvements marquent en effet la limite d'action des faits psychiques." (P. 148.)

As to the intellectual interpretations of emotion, whether from the side of sensations or ideas, he regards this as of much more importance than the psycho-physiologists allow. It may be called a universal interpretation, though not an explanation. In this he follows a rather disputable distinction of theories. "Nous désignerons les théories, qui traduisent les faits sans permettre de les prévoir, du nom de théories *interprétatives*; nous appellerons théories *explicatives* celles qui permettent de les prévoir." (P. 27). But a mere formal or descriptive interpretation scarcely deserves the term theory. The biological principle of the struggle of existence is discussed at some length and granted some place, but not regarded as universal. He emphasizes such exceptions as